

**RUNOFF OF DIAZINON FROM PAVED PLOTS
AND TEST SITES: SUMMARY OF RESULTS**

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1.0 INTRODUCTION

1.1 BACKGROUND

In response to concerns regarding diazinon in urban creeks in the San Francisco Bay Area, the California Regional Water Quality Control Board, San Francisco Bay Region has listed several Bay Area creeks and the San Francisco Bay as impaired due to diazinon.

1.2 PURPOSE/SCOPE

The Alameda County Flood Control and Water Conservation District (District) has contracted with Systech Engineering to develop a model that predicts the in-stream concentration of diazinon based on estimates of application rates in the watershed. The purpose of this study was to compile information on the runoff of diazinon from paved surfaces. The District anticipates that data on the runoff of diazinon from turf and bare ground will be produced by the California Department of Pesticide Regulation (CDPR) through the proposed CDPR/Fresno State runoff studies. The data from this study as well as from the Fresno State studies will be used to verify and refine the model of the buildup and runoff of diazinon in urban watersheds.

2.0 DIAZINON IN RUNOFF FROM PAVED TEST PLOTS

2.1 OBJECTIVE

The objective of this portion of the study was to determine the wash-off rate of diazinon from paved surfaces.

2.2 PROCEDURES

Four test plots were constructed, each consisting of a 4-foot square concrete slab two inches thick on a plywood base (see Appendix A for photographs).. Each plot was raised approximately 2.5 feet above the ground and sloped approximately 1/2 inch per foot. Galvanized flashing between the concrete and base directed runoff into a PVC gutter assembly (Orchard Supply Hardware, Repla-K style) with 1" inside diameter vinyl tubing for sample collection. Plywood barriers extending 2 inches above the slab prevented runoff from escaping on the other three sides of each plot. Plots were constructed in fall 2000 and allowed to cure for 7 days under plastic, then exposed to the weather for over 9 months. Joints between the concrete slab and plywood, and at corners of the plywood barrier, were caulked with silicone caulk at least 24 hours prior to spray application.

Rain was simulated with adjustable low-volume sprinklers mounted on the plywood barrier. Four quarter-circle units (Dripmaster model 61268) were mounted at the corners of each plot and two half-circle units (Raindrip model A187005) were attached to the middle of the sides parallel to direction of slope. Each set of sprinklers was connected with 1/4" vinyl tubing to a manifold/filter unit (Dripmaster 61008) that could be connected to a garden hose providing City of Hayward tap water. Sprinkler groups were constructed and tuned on the control plot prior to installation on treatment plots, so that each treatment plot was thoroughly dry for diazinon application.

To assess the wash off rate, diazinon solution was prepared according to the manufacturer's recommendation for by mixing 10 ml of product (Ortho , 22.4% active ingredient) with 620 ml of Hayward tap water. This mix was equivalent to the manufacturer's recommended rate of 4 tablespoons per gallon for control of pests around house foundations. Approximately 175 ml of solution was applied to each of three treatment plots using a hand-held pump sprayer with 1.8 liter capacity (Root-Lowell "Flowmaster" or HD Hudson "Planter Mist"). A fine spray of solution was applied evenly to the plots except for a 3-4" strip immediately adjacent to the edges. Treatment plots were spaced at least 10 feet apart and 20 feet away from the control plot, and spray was applied in calm weather to minimize transport of diazinon away from the plots.

Rainfall simulation for each treatment plot was started between 2 and 2-1/2 hours after diazinon application, when the plot surface appeared dry. A 5-1/2 foot high enclosure

with vinyl sheeting shielded the test plot from wind effects on the sprinklers and minimized possible redistribution of diazinon among plots. Runoff was collected in graduated large-volume Pyrex bottles which represented increments of either 0.24 or 0.53 inches of precipitation runoff (see Table 1.1). Average time to produce 2.6" of runoff was 45 minutes, equivalent to a rate of 3.5 inches per hour.

Table 2.1 Simulated runoff regime for large test plots.

Washoff increment	Collected runoff volume, liters	Equivalent runoff, inches	Cumulative runoff, inches	Time to fill bottle, minutes		
				A	B	C
1	9	0.24	0.24	4.8	5.5	6.8
2	9	0.24	0.48	4.7	~4	5.8
3	20	0.53	1.01	8.5	~7	10.8
4	20	0.53	1.54	8.6	7.5	10.5
5	20	0.53	2.07	7.5	7.5	11.3
6	20	0.53	2.60	7.5	7.5	9.3

Each large bottle was subsampled with an aliquot collected in a 20 mL borosilicate glass vial. Sample vials were refrigerated at 4-6°C and analyzed by ELISA (Enzyme Linked Immunosorbent Assay) according to the procedures in Katznelson and Feng (1998), using plate kits by Strategic Diagnostics Inc. Samples were also collected for similar runoff increments from the control plot, using a sprinkler to deliver overhead spray. Additional 1-liter aliquots were taken from the first control sample and one of the treatment samples for matrix spikes and quality control testing.

2.3 RESULTS

Diazinon concentrations for the first 1/4" runoff increment or "first flush" were significantly higher than for the remaining increments (Figure 2.1). However, concentrations appeared to level off after the first 1.5" of runoff and only a small proportion of the total mass applied was washed off during the experiment (Table 2.2).

Some of the runoff from the plots escaped the gutter collection system due to porosity of the concrete or imperfections in the caulking. Runoff loss for plots A and B was estimated as 0.2-0.3 liters/minute, or about 10% of the water applied for most plots; however the loss was up to 1 liter/minute for Plot C. The longer times required to fill each bottle suggest that 30-50% of the runoff was lost from Plot C, causing the lower concentrations observed in the samples from that plot.

The calculated rate of diazinon application was 3.9 grams per liter or 43mg/square foot. For ELISA analysis, the spray solution was diluted in both HPLC water (typically used for ELISA standards) and blank water collected from the control plot. ELISA estimates for diazinon in the spray solution were 3.6g/l for HPLC dilution and 3.4g/l for matrix dilution, indicating close agreement with the calculated concentration (see also Appendix C for discussion of matrix spike).

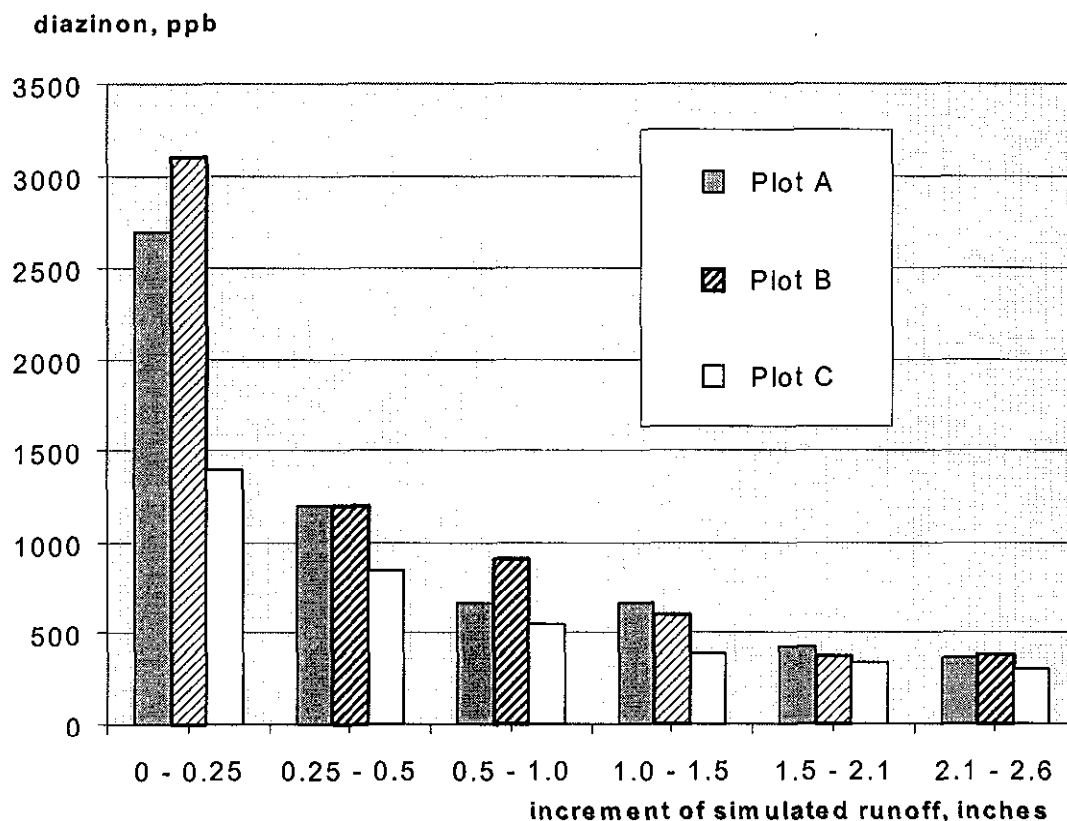


Figure 2.1 Diazinon concentration in runoff from large test plots receiving normal rate of application (estimated 40 mg/square foot).

Table 2.2 Diazinon wash-off from large test plots

Washoff increment	Collected runoff volume, liters	Cumulative runoff, inches	Average diazinon, ppb	Diazinon collected, mg	% of original diazinon collected*
1	9	0.24	2400	22	3%
2	9	0.48	1080	10	2%
3	20	1.01	710	14	2%
4	20	1.54	550	11	2%
5	20	2.07	380	8	1%
6	20	2.6	350	7	1%
Total				71	11%

* assumed application rate = 40 mg/square foot for each 16 square foot plot

3.0 EFFECT OF APPLICATION RATE ON RUNOFF RATE

3.1 OBJECTIVE

Determine if the rate of application of liquid spray diazinon to paved surfaces affects the rate of runoff.

3.2 PROCEDURES

Prefabricated concrete pavers (12" square x 2" thick: Orchard Supply Hardware) were used for this portion of the study. All pavers were prerinsed by spraying with hand-held pump sprayers set to fine spray, and allowed to dry for at least 4 days. Four pavers were randomly assigned to each of three treatment types (Table 3.1). Treatment solutions were dribbled from a clean 30 mL syringe and applied evenly over the top surface of each paver except for a 1" wide strip around the edge. Treated pavers were allowed to dry for 2 to 2-1/2 hours before wash off.

Table 3.1 Diazinon application treatments for small test plots.

Treatment type	Sample ID code	Solution applied	Application rate,	
			mL / sq. ft.	Diazinon mg / sq. ft.
Normal rate	R10	Diazinon Mix*	12	40
Half of normal rate	R05	Diazinon Mix*	6	20
Double normal rate	R20	Diazinon Mix*	24	80
Control	Spcon	Tap water	12	0

* mix = 5 ml of 25% active ingredient product in 315 ml tap water

The pavers were washed off with hand-held pump sprayers set to fine spray (see Appendix A for photograph). Each plot was placed inside a 14" x 18" x 7" deep high-density polyethylene tray (Traex deep bus box) and supported at an angle on a 3" high glass jar. Individual sprayers were randomly assigned to pavers at each incremental cycle, with a fixed amount of tap water sprayed for each sampling increment (Table 3.2). The volumes of actual runoff were measured in prerinsing and during wash-off of the normal and control treatments; these data were compared to the amount of water sprayed and used to estimate runoff volumes for the other treatments. Although washoff spraying was interrupted several times during each cycle to pump the sprayers, the time to complete each increment was roughly similar to the time needed to fill the comparable bottles from the large plots.

Table 3.2 Wash-off spray regime for small test plots.

Wash-off increment	Spray water applied, liters	Approximate volume of runoff, liters	Equivalent cumulative runoff, inches	Cumulative runoff, inches
1	.9	.5	0.21	0.21
2	.9	.6	0.47	0.47
3	1.3	1.1	0.93	0.93
4	1.3	1.2	1.44	1.44
5	1.3	1.2	1.95	1.95
6	1.3	1.2	2.46	2.60

After each spray increment, pavers were removed to a fresh set of trays and an aliquot of runoff was collected from each tray into a 20 mL vial. ELISA analysis was performed for all of the replicates for pavers receiving the normal application rate and selected replicates of the other treatments. Composite samples of several washoff increments were collected in replicate in 1 liter glass bottles and sent to an analytical laboratory (see Appendix E).

3.3 RESULTS

Diazinon concentrations in runoff from small plots followed the same general pattern as the large plots except that the average concentration increased for the second increment of the normal application. (Figure 3.1). Analytical laboratory results were in close agreement with ELISA results for 3 out of 5 composite samples but not for the second bottle (see Appendix C).

While the half-strength treatment produced runoff concentrations roughly half of those found at full strength, the double strength application only produced higher concentrations after the initial half inch of runoff. In later intervals, diazinon concentration for runoff from these pavers was consistently greater than from the pavers receiving the normal application. While the half-strength application had a "spotty" appearance when wet, both the normal and double strength applications provided more uniform coverage of the paver surface.

The concrete used for the pavers contained no large aggregate and the surface was finer-textured and smoother than the large plots. Replicate R10 "D" was noticeably more porous than the others, absorbing more water before initiation of runoff and producing a wet spot in the middle of the underside. This was probably the main cause of the much lower concentrations of diazinon washed off from this replicate, and less obvious differences in concrete quality were probably additional sources of variation in washoff rate from the small pavers.

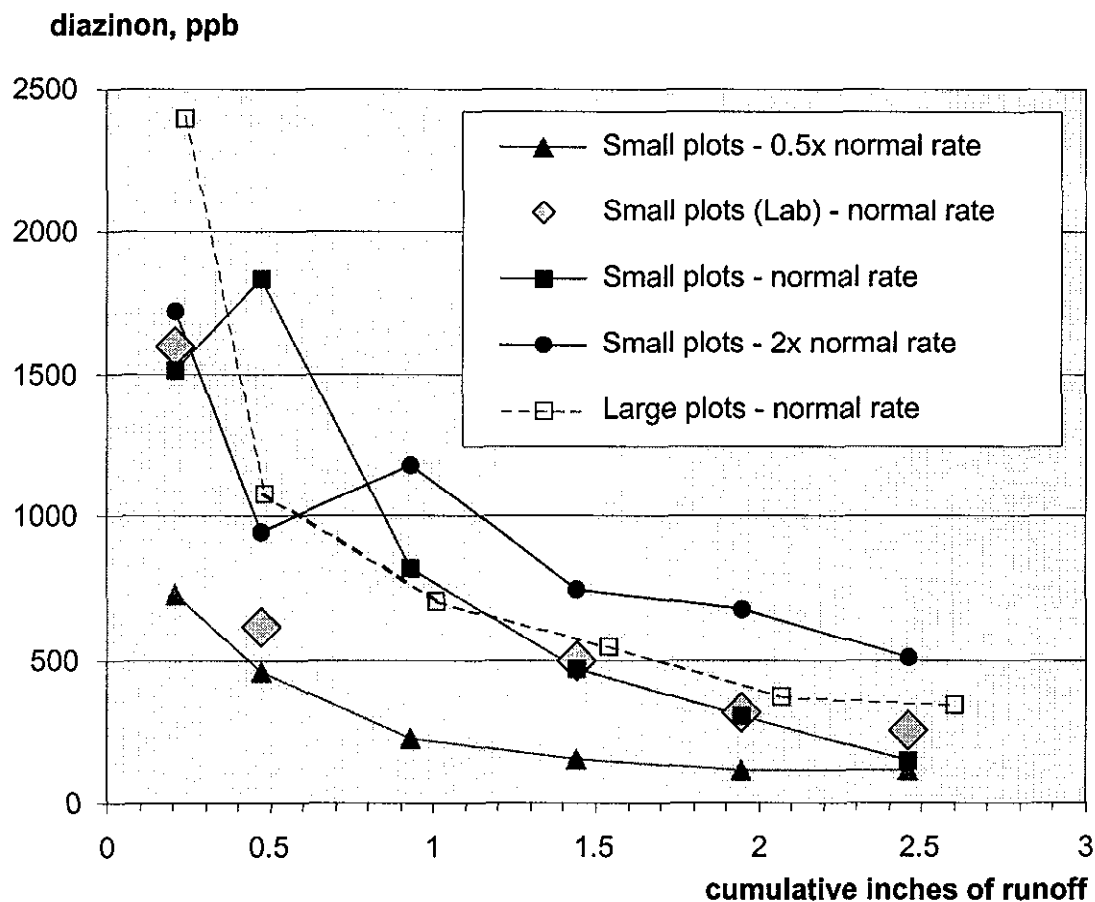


Figure 3.1 Average diazinon concentration in runoff from small test plots receiving different application rates. (Runoff diazinon from large plots also shown for comparison)

4.0 DIAZINON IN RAINFALL AND RUNOFF AT TEST SITES

4.1 OBJECTIVES

Determine the range of diazinon concentrations in rainfall and various forms of runoff at real world test sites receiving typical applications of diazinon.

4.2 PROCEDURE

Diazinon solution was applied around the perimeter of buildings at two test sites as follows:

Three sites were used for this part of the study:

1. Alameda County Maintenance Yard on Turner Court in Hayward CA (sample prefix TC). The shop lies near the center of the site and most of the surface between buildings is paved with asphalt. Diazinon solution was mixed and applied to the perimeter of the shop building at a rate similar to the normal rate of application used on the test plots. On November 18, 2000, 3 gallons of solution containing a calculated mass of 13 grams of diazinon were applied to approximately 1000 square feet in a 3 foot wide strip (Figure 4.1). Seven storm events were sampled between November 20, 2000 and March 5, 2001. A weather station was installed to measure air temperature, relative humidity, solar radiation, wind direction and wind speed (at +15 feet above pavement). There is an existing rain gauge at the site, but it did not obtain records prior to January.
2. Obaid Khan residence in Pleasant Hill CA (sample prefix OK). 1 gallon of the same mix, with a calculated mass of 13 grams of diazinon, was applied to a portion of the perimeter of the building and a rear patio on November 19, 2000 (See Figure 4.5). Two storm events were sampled on November 20-21 and November 28-29, 2000.
3. Dunlop residence in Pleasanton CA (sample prefix DR). A commercial pest control operator visits this site quarterly. On February 3, 2001, 75 gallons of solution containing about 90 g of diazinon were applied over all paved and unpaved portions of the 5,000 square foot lot (See Figure 4.6). Four storm events were sampled between February 9 and March 4, 2001.

Samples consisted of 3 types:

1. Rainfall was collected in 8" by 8" glass baking pans that were set out before storm events at stations in various parts of the site. During the first event at Turner Court some pans were only sampled after the first 1/4" of rainfall, while others were sampled several times and emptied after each sample. The amount of rainfall

- collected was estimated for each pan, with supplemental measurements of some samples using a graduate as a check.
2. Roof drains at the Turner Court site only were grab sampled at the base of exposed downspouts. On the shop building, the sampled downspout was covered with plastic during the spray application and spraying was omitted for adjacent portions of the perimeter.
 3. Puddles receiving runoff from paved areas or landscaped areas were grab sampled at Turner Court and Dunlop Residence.

Samples were collected in 20 ml vials, held at 4-6 °C and analyzed by using ELISA. A few rain and roof drain samples were collected in 250 ml jars for lab replicate and matrix spike tests.

4.3 RESULTS

Diazinon was detected in all samples. Appendix B contains a complete listing of ELISA results. Grab samples in puddles receiving runoff from sprayed areas contained the highest concentrations, comparable in magnitude to runoff from test plots.

Turner Court site: Table 4.1 summarizes the samples collected and the range of diazinon concentrations (See Appendix D for detailed summaries). Diazinon in grab samples from parking lot puddles near the spray area ranged up to 1,900 ppb on November 29, when about 7/8" of cumulative precipitation had occurred post-application.

For any individual storm event, rainfall concentrations generally decreased with increasing distance and elevation from the sprayed area (Figure 4.2). However, concentrations for individual stations depended partly on the amount of rainfall represented, due to a dilution effect (Table 4.2).

Table 4.1. Summary of sampled events at Turner Court

Event	Estimated rainfall, in.	Types and numbers of samples collected	Range of Diazinon concentrations (ppb or ug / l)
Oct. 25-28, 2000 Pre-spray control	7/8-1	Rainfall: 1 station, 2 sequential samples	0.03-0.05
1. Nov 20-22, 2000	1/2-5/8	Rainfall: 4 for total storm, 7 for first 1/4" only Roof drains: 2 (3 times)	0.11 to 15 0.09 to 0.72 0.17 to 0.53
2. Nov. 28-29, 2000	1/4-3/8	Rainfall: 14 Roof drains: 2 Paved lot: 5	0.08 to 4.9 0.14 to 0.28 0.22 to 1,900

3. Dec. 9-12, 2000	3/4	Rainfall: 10 Roof drains: 3 Paved lot: 4	0.9 to 1.1 0.13 to 0.30 0.19 to 110
4. Dec. 13-15, 2000	1	Rainfall: 4	0.13 to 1.0
5. Jan. 8-11, 2001	11/4	Rainfall: 12 Paved lot: 8	<0.10 to 0.37 0.17 to 22
6. Feb. 24, 2001	3/8-1/2	Roof drains: 1 Paved lot: 4	<0.10 <0.10 to 2.0
7. March 2-4, 2001	1/2-5/8	Paved lot: 5	<0.10 to 1.0

Table 4.2 Diazinon concentrations in ppb for selected Turner Court sampling stations in November and December 2000.*

Sampling Date		21-Nov	21-Nov	22-Nov	29-Nov	12-Dec	15-Dec
Event No		1a	1d	1e	2	3b	4
Rainfall, inches		1/4-3/8"	1/8"	<1/8"	1/4"-3/8"	3/4"	1"-1 ¹ /8"
Station ID	Distance to spray area, ft.						
BID-NE	120	0.23	0.25	1.8	0.082	0.13	0.14
SHOP-SW	12				4.9	0.87	1.0
SHOP-NW	17	4.4	4.6	15	3.0	1.1	0.92
M&O-S	50	0.35			0.26	0.19	0.24
PK-A86N	70				0.72	0.23	
TS2-SE	120	0.29	0.20	0.60	0.20	0.15	
WASH-NW	250	0.36			0.37	0.15	
TRAF-NE	70	0.25	0.23		0.63	0.10	

* See Table D-1, Appendix D for complete sample summary
See Figure 4.3 for locations of stations

When diazinon mass in rainfall per square foot was estimated from the rainfall (pan) samples for the first four events, the variability over time was reduced (see Table D-2 in Appendix D). Wind direction, and wind and rain intensity may have affected the rate of transport since the sprayed area is under a roof overhang. A coarse model using two concentric zones of rainfall concentration was used to make a rough estimate of the total mass of Diazinon in rain (Figure 4.4). These calculations suggest that approximately 50-

60 milligrams, or 0.4% of the original amount applied, was redistributed to the rest of the site during the first 4 storm events:

Area A:	9,000	Sq. ft. x	3.0	micrograms/sq. ft. =	27	Mg
Area B:	152,000	Sq. ft. x	0.2	micrograms/sq. ft. =	30	Mg
					<u>57</u>	Total mg

Obaid Khan residence: Figure 4.5 shows the application area, approximate location of collection pans and diazinon concentrations in rain samples. The positioning of sampling pans away from the application area probably was a factor in the reduced concentrations found in rain at this site.

Dunlop residence: Figure 4.6 shows the location of sampling stations at this site and Table 4.3 summarizes rainfall and diazinon concentrations for the sampled storm events. Initial concentrations in puddles were high after 1.5" of rainfall, and decreased steeply in subsequent samples.

Table 4.3 Diazinon concentrations in ppb at Dunlop residence sampling stations in February and March 2001.

Sampling Date		10-Feb	11-Feb	18-Feb	24-Feb	4-Mar
Event No		1a	1b	2	3	4
Rainfall, inches in pan		1 1/2"	1"	1/8"-1/4"	N/A	<1/4"
Station ID	Description					
PAT-TAB	Patio table- rain	1.5	0.37	0.81		<0.10
REAR-N	Near fence under eucalyptus- rain			1.2		0.39
REAR-S	Near fence towards south- rain			0.30		0.10
LAWN-F				2.8		1.1
WALL-N	Wall left		1.3			
WALL-S	Wall right		2.7			
PAT-N	Patio-puddle	750			5.2	
LAWN-S	Lawn left of home-puddle	22			0.26	
DRV-N	Left of driveway-puddle	310			1.1	
GUTTER	Gutter in front of driveway-puddle	181	52	73	2.8	

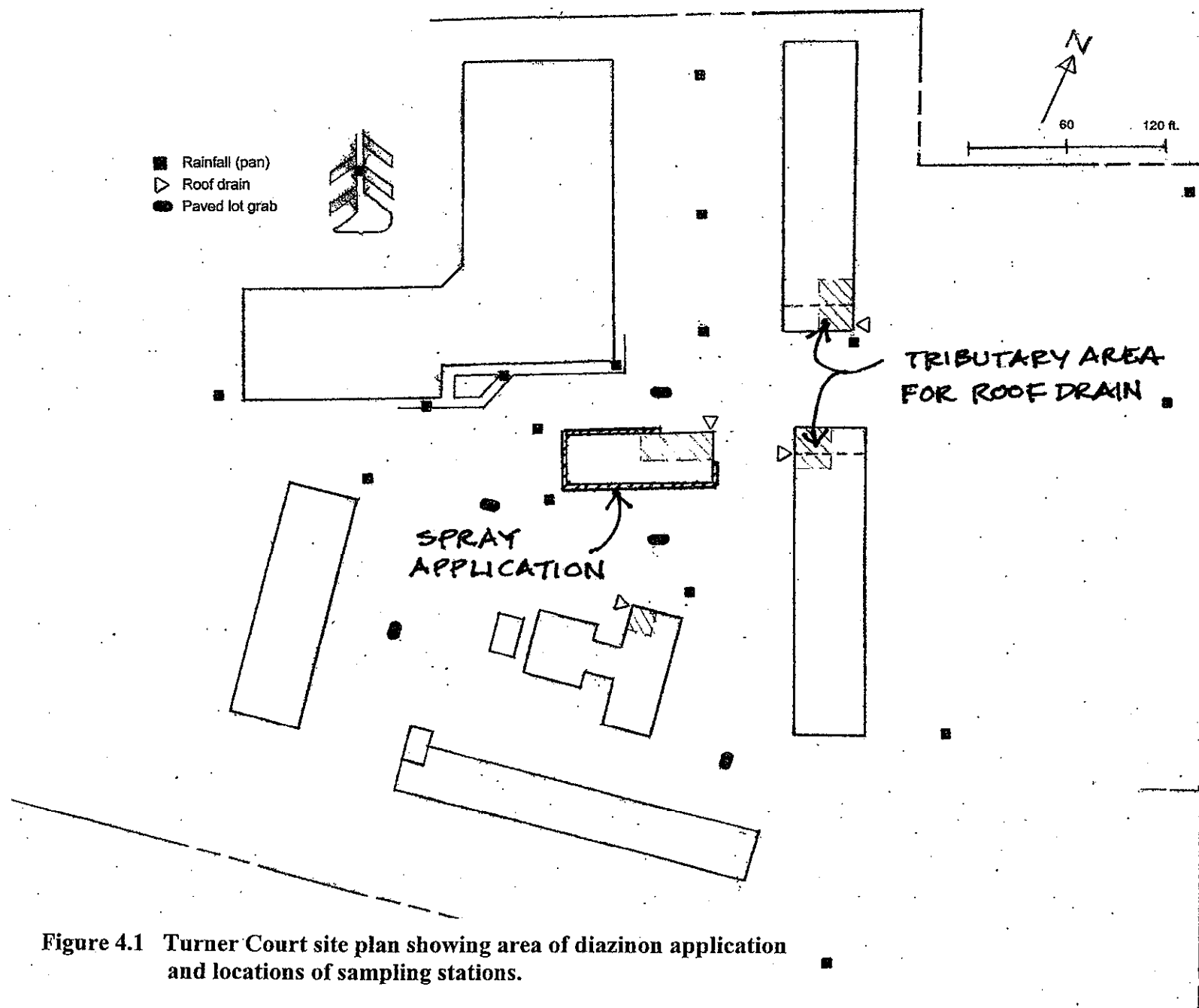


Figure 4.1 Turner Court site plan showing area of diazinon application and locations of sampling stations.

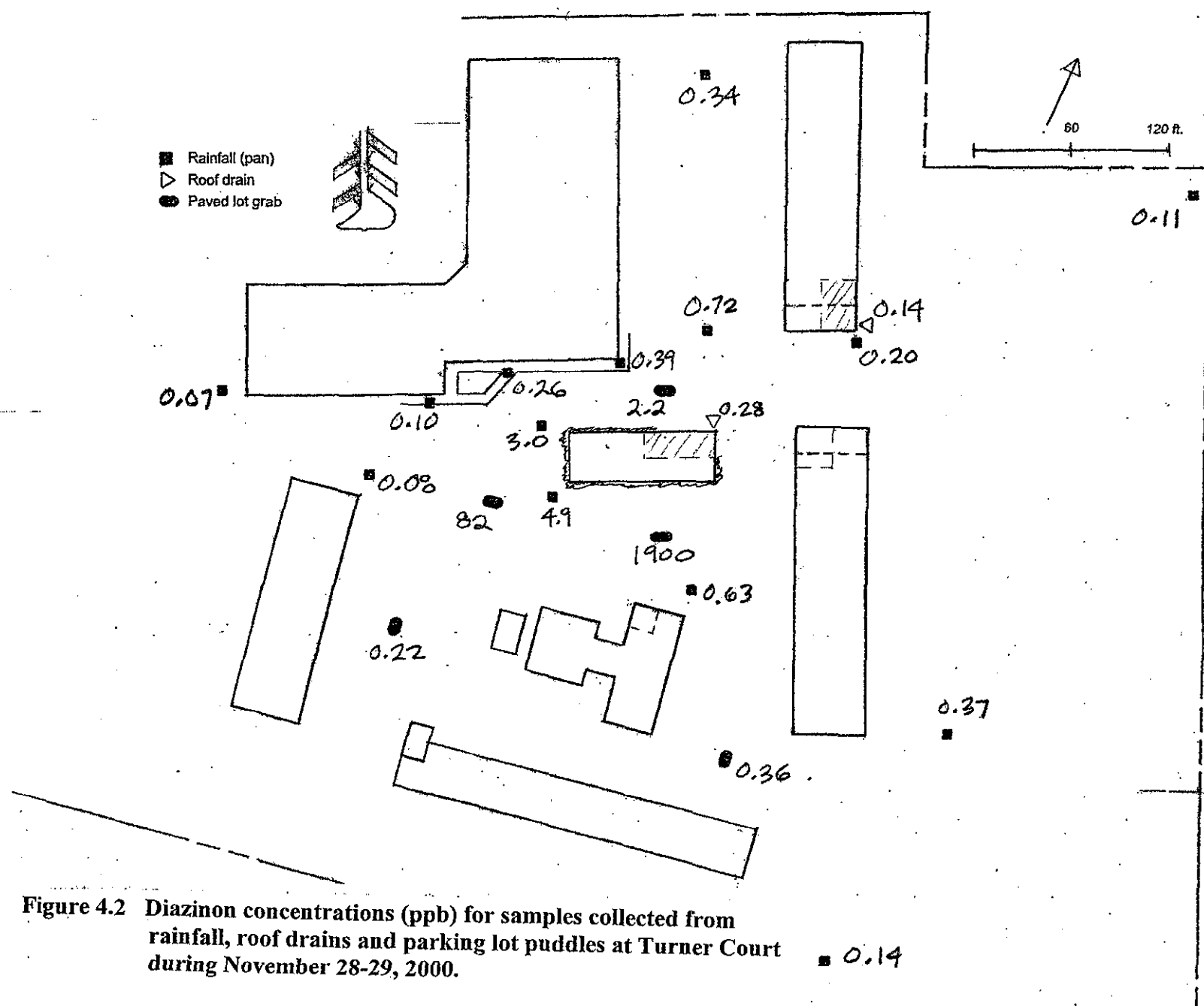


Figure 4.2 Diazinon concentrations (ppb) for samples collected from rainfall, roof drains and parking lot puddles at Turner Court during November 28-29, 2000.

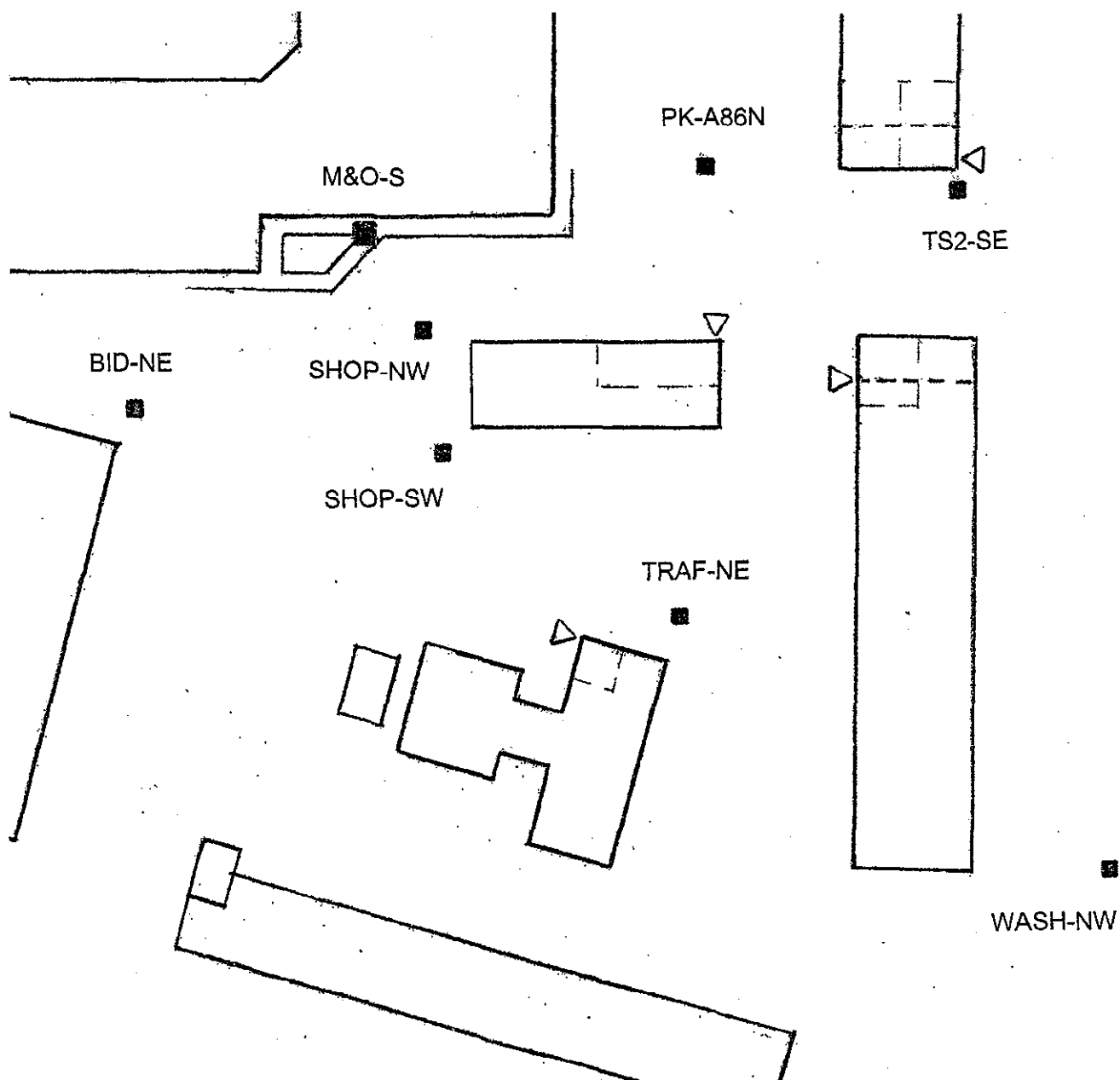


Figure 4.3 Locations of selected sampling stations at Turner Court
(diazinon concentrations listed in Table 4.2 for samples collected
during November and December 2000)

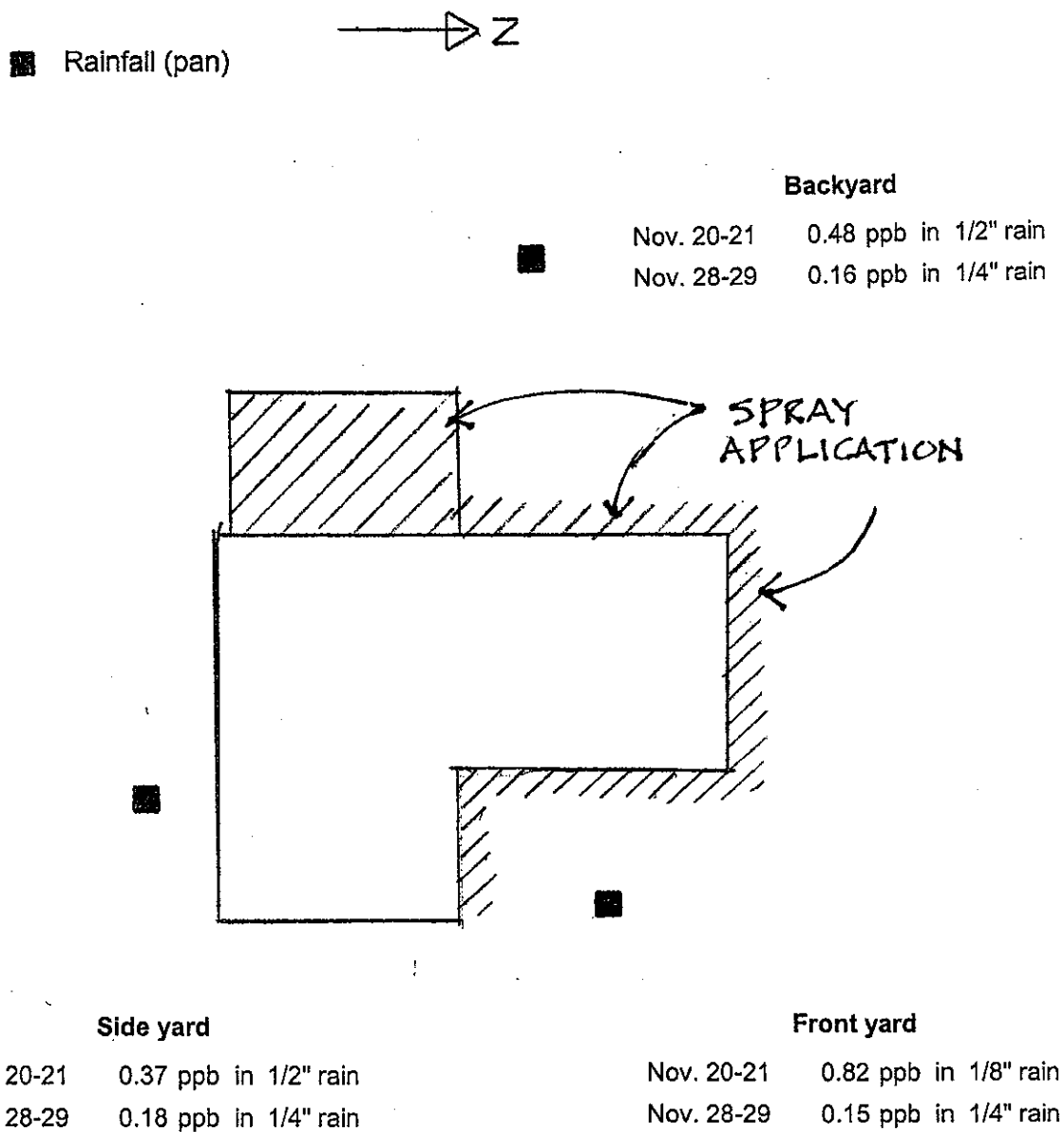


Figure 4.4 Khan residence site plan showing area of diazinon application and concentrations (ppb) in rainfall samples taken during November 2000.

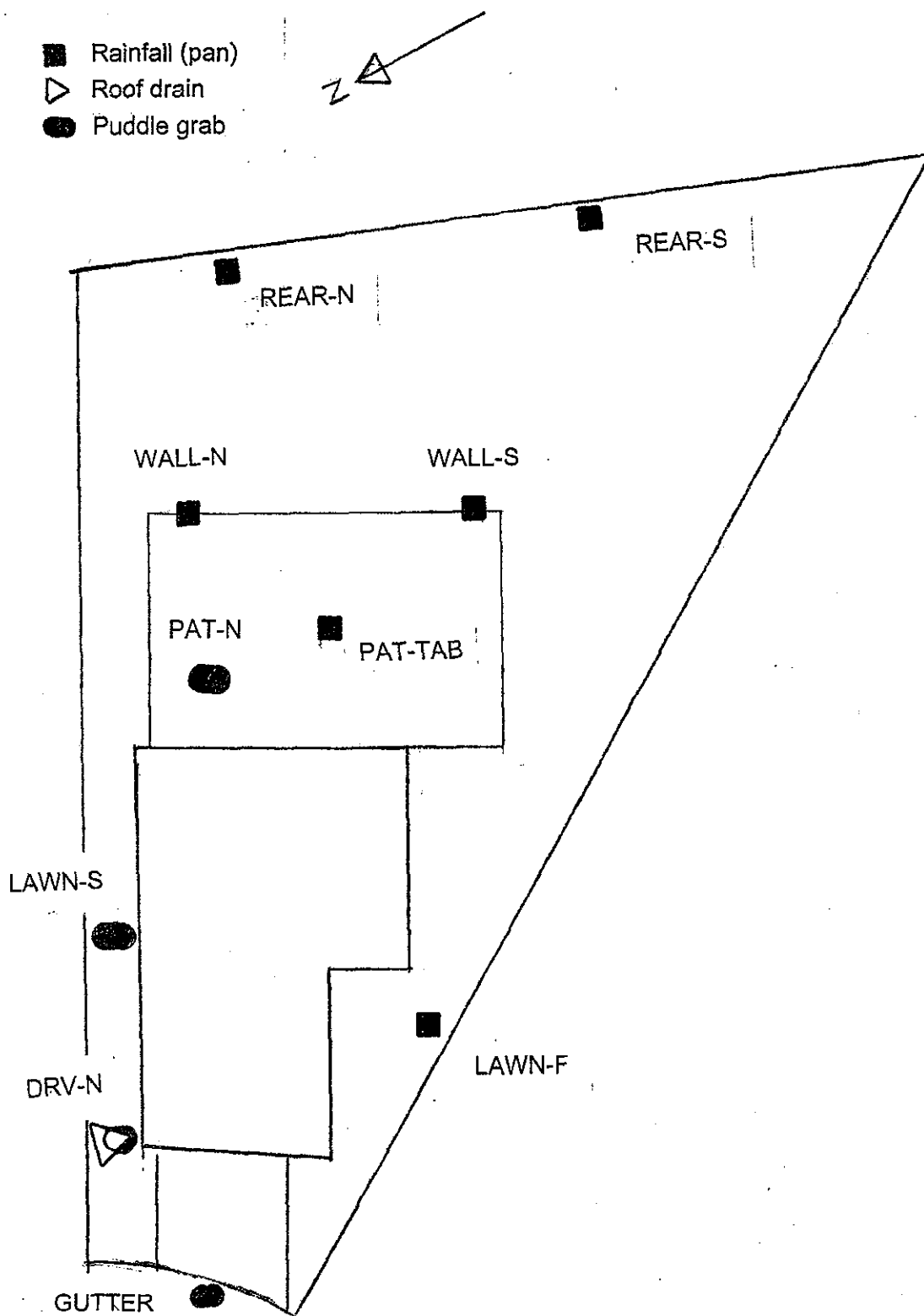


Figure 4.5 Dunlop residence site plan showing locations of sampling stations (diazinon concentrations listed in Table 4.3)

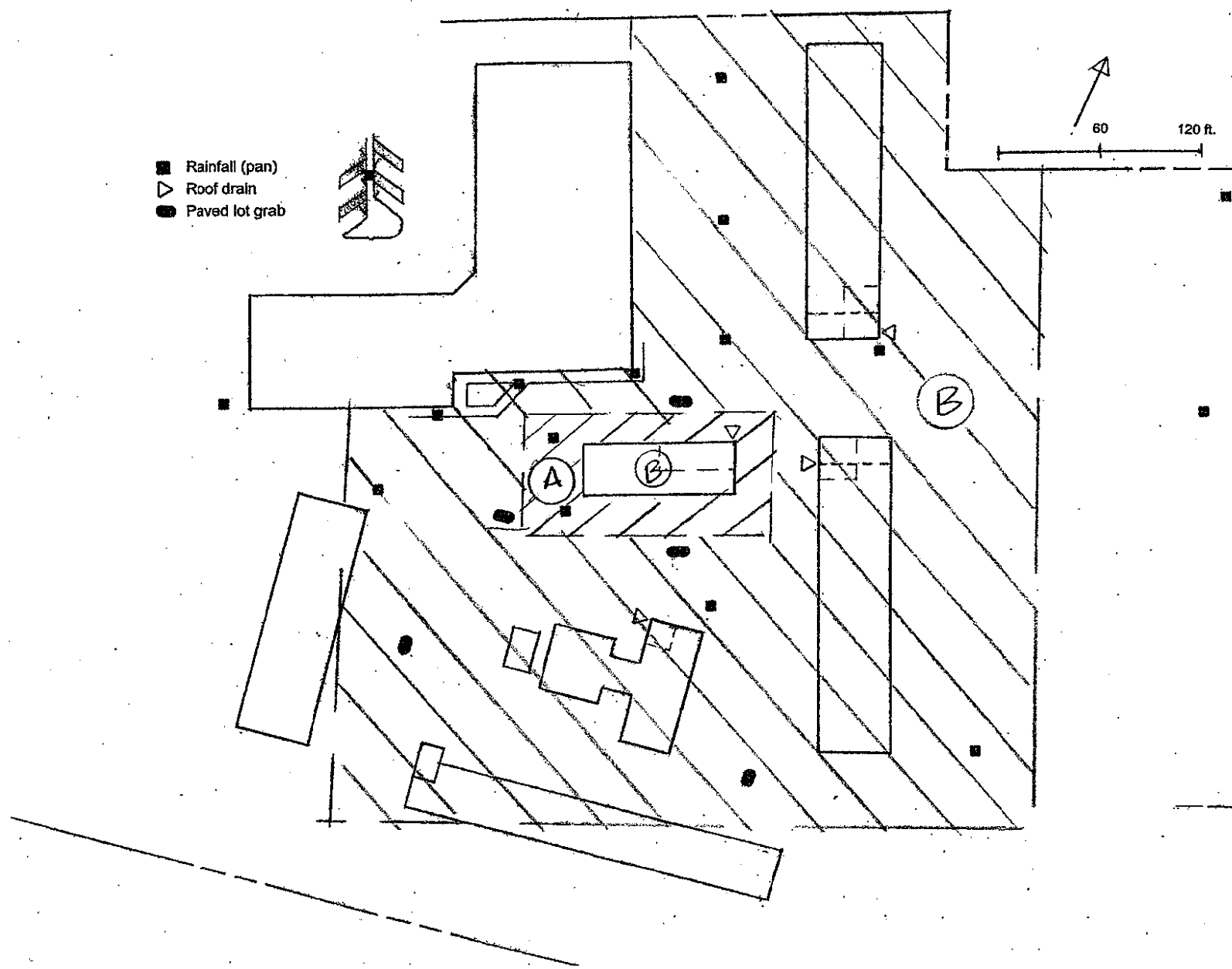


Figure 4.6 Simplified two-zone model of diazinon mass in rainfall at Turner Court.

5.0 SUMMARY AND FINDINGS

Washoff removal of diazinon from concrete test plots was greatest for the first 1/4" of runoff created by simulated heavy rainfall and declined rapidly during the next 1" of runoff. The washoff rate was influenced by the cumulative amount of simulated rainfall, the rate of initial diazinon application, and by variations in the surface characteristics of individual plots.

Diazinon was detected in rainfall samples taken over 250 feet from the application areas of actual sites and continued to occur after several months. Diazinon concentrations in grab samples from puddles in paved areas near sprayed areas were similar in magnitude to those observed in runoff from test plots.

APPENDIX A.-- Photographs of test plots and Turner Court site

Photos 1 & 2: Large Plots



Photo 3: Rinsing Small Plots



Photo 4: Supply Shop Viewed from the North



Photo 5: Supply Shop Viewed from the South



Photo 6: From Supply Shop Down Spout Looking West



Photo 7: Supply Shop from Front Gate



APPENDIX B.-- ELISA data summaries

Table B-1a

Large Plot results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
Lcon1	100.00%	OoR-L	22	8/16/01					DWOdz30	8/20/01
Lcon1	100.00%	OoR-L	13	8/16/01	14:37	20 E	2	37.9711	DWOdz30	8/20/01
Lcon2	100.00%	OoR-L	18	8/16/01	14:38	20	1		DWOdz30	8/20/01
Lcon6	100.00%	OoR-L	15	8/16/01		20	1		DWOdz30	8/20/01
LT-A1	0.00%		2392749	8/23/01	14:45			--	DWOdz31	8/25/01
LT-A1	0.01%		3023522	8/23/01	14:45			--	DWOdz32	8/27/01
LT-A1	0.01%		2623933	8/23/01	14:45	2700000	3	11.9068	DWOdz33	8/29/01
LT-A2	0.01%		1162185	8/23/01	14:50	1200000	1		DWOdz32	8/27/01
LT-A3	0.01%		659305	8/23/01	14:58	660000	1		DWOdz32	8/27/01
LT-A4	0.04%		802996	8/23/01	15:07				DWOdz32	8/27/01
LT-A4	0.01%		519622	8/23/01	15:07	660000	2	30.2999	DWOdz32	8/27/01
LT-A5	0.04%		423976	8/23/01	15:14	420000	1		DWOdz32	8/27/01
LT-A6	0.04%		361390	8/23/01	15:20	360000	1	--	DWOdz31	8/25/01
LT-B1	0.00%		2953822	8/23/01	17:37				DWOdz32	8/27/01
LT-B1	0.01%		3224145	8/23/01	17:37			--	DWOdz32	8/27/01
LT-B1	0.01%		3092863	8/23/01	17:37	3100000	3	4.37437	DWOdz32	8/27/01
LT-B2	0.01%		1184354	8/23/01	17:41	1200000	1	--	DWOdz32	8/27/01
LT-B3	0.04%		913095	8/23/01	17:48	910000	1		DWOdz32	8/27/01
LT-B4	0.04%		603381	8/23/01	17:56	600000	1		DWOdz33	8/29/01
LT-B5	0.04%		374828	8/23/01	18:03	370000	1		DWOdz33	8/29/01
LT-B6	0.04%		421054	8/23/01	18:10				DWOdz33	8/29/01
LT-B6	0.04%		337960	8/23/01	18:09	380000	2	15.4823	DWOdz32	8/27/01
LT-C1	0.01%		1336601	8/23/01	19:28				DWOdz32	8/27/01
LT-C1	0.01%		1301181	8/23/01	19:28			--	DWOdz33	8/29/01
LT-C1	0.02%		1479133	8/23/01	19:28	1400000	3	6.86404	DWOdz33	8/29/01
LT-C2	0.02%		832977	8/23/01	19:34				DWOdz33	8/29/01
LT-C2	0.01%		862216	8/23/01	19:34	850000	2	2.43918	DWOdz32	8/27/01
LT-C3	0.02%		554449	8/23/01	19:45	550000	1		DWOdz33	8/29/01
LT-C4	0.04%		391536	8/23/01	19:55	390000	1		DWOdz33	8/29/01
LT-C5	0.10%		334734	8/23/01	20:06				DWOdz33	8/29/01
LT-C5	0.04%		336111	8/23/01	20:06	340000	2	0.29024	DWOdz33	8/29/01
LT-C6	0.04%		299118	8/23/01	20:14	300000	1	--	DWOdz31	8/25/01

Large Plot results

2

Table B-1b

Small Plot results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
SPcon-A pre	100.00%	OoR-L	20	7/20/01	15:40	20 E	1		DWOdz25	7/29/01
SPCON-1A	0.05		4787	7/27/01	14:35	4800	1		DWOdz26A	37105
SPCON-1B	5.00%		5803	7/27/01	14:35	5800	1		DWOdz29	8/5/01
SPCON-1C	5.00%		3614	7/27/01	14:35	3600	1		DWOdz29	8/5/01
SPCON-1D	5.00%		4281	7/27/01	14:40	4300	1		DWOdz29	8/5/01
SPCON-2A	5.00%		1987	7/27/01	15:20	2000	1		DWOdz29	8/5/01
SPCON-2B	5.00%		582	7/27/01	15:20	580	1		DWOdz29	8/5/01
SPCON-2C	5.00%		7706	7/27/01	15:20	7700	1		DWOdz29	8/5/01
SPCON-2D	5.00%		1020	7/27/01	15:20	1000	1		DWOdz29	8/5/01
SPCON-3A	100.00%	OoR-H	491	7/27/01	15:55	490	1		DWOdz29	8/5/01
SPCON-3B	100.00%		119	7/27/01	15:55	120	1		DWOdz29	8/5/01
SPCON-3C	25.00%		455	7/27/01	15:55	460	1		DWOdz29	8/5/01
SPCON-3D	100.00%		228	7/27/01	15:55	230	1		DWOdz29	8/5/01
SPCON-4A	100.00%	OoR-H	482	7/27/01	16:30	480	1		DWOdz29	8/5/01
SPCON-4B	100.00%		73	7/27/01	16:30	70	1		DWOdz29	8/5/01
SPCON-4C	100.00%	OoR-H	682	7/27/01	16:30	>800	1		DWOdz29	8/5/01
SPCON-5A	100.00%		104	7/27/01	17:10	100	1		DWOdz29	8/5/01
SPCON-5B	100.00%		51	7/27/01	17:10	50	1		DWOdz29	8/5/01
SPcon-postA	100.00%	OoR-L	22	8/7/01	12:15	20 E	1		DWOdz30	8/20/01
SPcon-postB	100.00%	OoR-L	16	8/7/01	12:15	20 E	1		DWOdz30	8/20/01
R10-Bpre	100.00%	OoR-L	26	7/20/01	14:55	30 E	1		DWOdz25	7/29/01
R10-Cpre	100.00%	OoR-L	20	7/20/01	15:15	20 E	1		DWOdz25	7/29/01
R10-1A	0.00%		2131218	7/25/01	11:55			--	DWOdz24	7/29/01
R10-1A	0.01%		2242708	7/25/01	11:55				DWOdz29	8/5/01
R10-1B	0.02%	OoR-H	2436978	7/25/01	11:55	2200000	2	3.60479	DWOdz29	8/5/01
R10-1B	0.01%		1379284	7/25/01	11:55	1400000	1		DWOdz27	8/5/01
R10-1C	0.01%		2410410	7/25/01	12:00	2400000	1		DWOdz27	8/5/01
R10-1D	0.40%		46441	7/25/01	12:00				DWOdz29	8/5/01
R10-1D	0.10%		61743	7/25/01	12:00			--	DWOdz28	8/5/01
R10-1D	0.40%		46469	7/25/01	12:00	52000	3	17.1224	DWOdz28	8/5/01
R10-2A	0.00%		4340369	7/25/01	12:40			--	DWOdz24	7/29/01
R10-2A	0.01%		2854485	7/25/01	12:40	3600000	2	29.2064	DWOdz28	8/5/01
R10-2B	0.01%		2124393	7/25/01	12:40				DWOdz28	8/5/01
R10-2B	0.00%		2074340	7/25/01	12:40			--	DWOdz27	8/5/01
R10-2B	0.01%		1888932	7/25/01	12:40	2000000	3	6.11295	DWOdz27	8/5/01
R10-2C	0.01%		1669213	7/25/01	12:40				DWOdz27	8/5/01

Table B-1b

Small Plot results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
R10-2C	0.00%		1981220	7/25/01	12:40			--	DWOdz27	8/5/01
R10-2C	0.01%		1439019	7/25/01	12:40	1700000	3	16.0407	DWOdz27	8/5/01
R10-2D	0.40%		49252	7/25/01	12:40				DWOdz29	8/5/01
R10-2D	0.10%		55269	7/25/01	12:40	52000	2	8.1404188	DWOdz28	8/5/01
R10-3A	0.02%		797686	7/25/01	14:40			--	DWOdz26A	8/2/01
R10-3A	0.04%		884507	7/25/01	14:40	840000 *	2	7.2989557	DWOdz26A	8/2/01
R10-3B	0.02%		1435891	7/25/01	14:40	1400000	1	--	DWOdz29	8/5/01
R10-3C	0.04%		863143	7/25/01	14:40	860000	1		DWOdz28	8/5/01
R10-3D	0.10%		187466	7/25/01	14:40	190000	1		DWOdz28	8/5/01
R10-4A	0.04%		479436	7/25/01	15:40	480000	1		DWOdz28	8/5/01
R10-4B	0.04%		635120	7/25/01	15:40				DWOdz28	8/5/01
R10-4B	0.02%		503241	7/25/01	15:40			--	DWOdz27	8/5/01
R10-4B	0.04%		726223	7/25/01	15:40	620000	3	18.04	DWOdz27	8/5/01
R10-4C	10.00%		705502	7/25/01	15:40	710000	1		DWOdz28	8/5/01
R10-4D	0.40%		68965	7/25/01	15:40				DWOdz28	8/5/01
R10-4D	0.10%		73216	7/25/01	15:40	72000	2	4.22805	DWOdz28	8/5/01
R10-5A	0.04%		446571	7/25/01	17:00	450000	1	--	DWOdz28	8/5/01
R10-5B	0.04%		420713	7/25/01	17:00	420000	1		DWOdz28	8/5/01
R10-5C	0.04%		317586	7/25/01	17:00	320000	1		DWOdz28	8/5/01
R10-5D	0.40%		49046	7/25/01	17:00				DWOdz28	8/5/01
R10-5D	0.10%		47545	7/25/01	17:00	48000	2	2.20	DWOdz28	8/5/01
R10-6A	0.04%		196817	7/25/01	17:45				DWOdz26A	8/2/01
R10-6A	0.10%		271988	7/25/01	17:45	230000*	2	22.68	DWOdz26A	8/2/01
R10-6B	0.10%		169785	7/25/01	17:45				DWOdz27	8/5/01
R10-6B	0.04%		146031	7/25/01	17:45	160000	2	10.6367	DWOdz27	8/5/01
R10-6C	0.10%		184158	7/25/01	17:45				DWOdz27	8/5/01
R10-6C	0.04%		156171	7/25/01	17:45	170000	2	11.6299	DWOdz27	8/5/01
R10-6D	0.40%		45944	7/25/01	17:45				DWOdz28	8/5/01
R10-6D	0.10%		37558	7/25/01	17:45	42000	2	14.202125	DWOdz27	8/5/01
R10-postA	0.05%		155999	8/7/01	16:30	160000	1	--	DWOdz31	8/25/01
R10-postB	10.00%	OoR-H	13575	8/7/01	16:30	>100,000 E	0	--	DWOdz30	8/20/01
R10-postD	100.00%	OoR-H	1344	8/7/01	16:30				DWOdz30	8/20/01
R10-postD	10.00%	OoR-H	12818	8/7/01	16:30	>100,000 E	0	--	DWOdz30	8/20/01
R05-1A	0.02%		699639	8/26/01	14:50	700000	1		DWOdz33	8/29/01
R05-1B	0.02%		682065	8/26/01	14:50	680000	1		DWOdz33	8/29/01
R05-1C	0.02%		788785	8/26/01	14:50	790000	1		DWOdz33	8/29/01

Table B-1b

Small Plot results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
R05-1D	0.02%		755125	8/26/01	14:50	760000	1		DW0dz33	8/29/01
R05-4A	0.10%		163963	8/26/01	14:50	160000	1		DW0dz35	8/29/01
R05-2A	0.04%		304004	8/26/01	15:06				DW0dz34	8/29/01
R05-2A	0.02%		355883	8/26/01	15:06	330000	2	11.1182	DW0dz33	8/29/01
R05-2B	0.04%		214746	8/26/01	15:06	210000	1		DW0dz34	8/29/01
R05-2C	0.04%		604936	8/26/01	15:06	600000	1		DW0dz34	8/29/01
R05-2D	0.04%		699623	8/26/01	15:06	700000	1		DW0dz34	8/29/01
R05-3A	0.10%		229380	8/26/01	15:22				DW0dz33	8/29/01
R05-3A	0.04%		199161	8/26/01	15:22	210000	2	9.97227	DW0dz33	8/29/01
R05-3B	0.10%		124315	8/26/01	15:22	120000	1		DW0dz35	8/29/01
R05-3C	0.10%		283356	8/26/01	15:22	280000	1		DW0dz35	8/29/01
R05-3D	0.10%		319048	8/26/01	15:22	320000	1		DW0dz35	8/29/01
R05-5A	0.10%		138597	8/26/01	15:57	140000	1		DW0dz35	8/29/01
R05-5B	0.10%		105429	8/26/01	15:57				DW0dz35	8/29/01
R05-5B	0.10%		92104	8/26/01	15:57	99000	2	9.53973	DW0dz35	8/29/01
R05-5BdlIR	0.10%		100014	8/26/01	15:57	100000	1		DW0dz35	8/29/01
R05-6A	0.10%		121879	8/26/01	16:13	120000	1		DW0dz33	8/29/01
R20-1A	0.00%		2057976	8/28/01	11:18	2100000	1		DW0dz34	8/29/01
R20-1B	0.00%		1297758	8/28/01	11:18	1300000	1		DW0dz34	8/29/01
R20-1C	0.00%		1230519	8/28/01	11:18	1200000	1		DW0dz34	8/29/01
R20-1D	0.00%		2329984	8/28/01	11:18	2300000	1		DW0dz34	8/29/01
R20-2A	0.01%		1177813	8/28/01	11:18	1200000	1		DW0dz34	8/29/01
R20-2B	0.01%		689418	8/28/01	11:18	690000	1		DW0dz34	8/29/01
R20-3A	0.02%		1601133	8/28/01	11:37				DW0dz34	8/29/01
R20-3A	0.01%		1319374	8/28/01	11:37	1500000	2	13.64	DW0dz34	8/29/01
R20-3B	0.02%		863784	8/28/01	11:37	860000	1		DW0dz34	8/29/01
R20-4A	0.02%		752196	8/28/01	11:57	750000	1		DW0dz34	8/29/01
R20-5A	0.02%		676271	8/28/01	12:21	680000	1		DW0dz34	8/29/01
R20-6A	0.02%		550528	8/28/01	12:38	550000	1		DW0dz34	8/29/01
R20-6C	0.02%		467652	8/28/01	12:38	470000	1		DW0dz34	8/29/01
R20-6D	0.02%		736358	8/28/01	12:38	770000	1		DW0dz34	8/29/01

Table B-1b

Small Plot results

[illegible]

Table B-2a

TC1 - TC5 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC1-G1	100.00%		90	11/21/00	12:29	90	1		DWOdz02	11/21/00
TC1-G2	100.00%		190	11/21/00	12:27	190	1		DWOdz02	11/21/00
TC1-G3	100.00%		330	11/21/00	12:10			--	DWOdz02	11/21/00
TC1-G3	100.00%		260	11/21/00	12:10			--	DWOdz05	11/22/00
TC1-G3	100.00%		280	11/21/00	12:10	290	3	13.44	DWOdz06	11/22/00
TC1-G4	100.00%		270	11/21/00	12:12	270	1		DWOdz02	11/21/00
TC1-G5	25.00%		260	11/21/00	12:14			--	DWOdz03	11/22/00
TC1-G5	100.00%		410	11/21/00	12:14			--	DWOdz02	11/21/00
TC1-G5	100.00%	OoR-H	420	11/21/00	12:14	362	3	24.03	DWOdz06	11/22/00
TC1-G6	100.00%		220	11/21/00	12:23			--	DWOdz02	11/21/00
TC1-G6	100.00%		240	11/21/00	12:23	230	2	8.76	DWOdz05	11/22/00
TC1-G6B (field rep)	100.00%		250	11/21/00	12:23	250	1		DWOdz02	11/21/00
TC1-G7	1.56%		4800	11/21/00	12:18			--	DWOdz03	11/22/00
TC1-G7	6.25%		4000	11/21/00	12:18			--	DWOdz03	11/22/00
TC1-G7	6.25%		4300	11/21/00	12:56	4380	3	9.53	DWOdz04	11/22/00
TC1-G8	100.00%		320	11/21/00	12:19			--	DWOdz02	11/21/00
TC1-G8	100.00%		380	11/21/00	12:19	347	2	13.15	DWOdz02	11/21/00
TC1-G9	25.00%		250	11/21/00	12:05			--	DWOdz02	11/21/00
TC1-G9	100.00%		250	11/21/00	12:05			--	DWOdz02	11/21/00
TC1-G9	100.00%		250	11/21/00	12:05	249	3	0.92	DWOdz05	11/22/00
TC1-G9B	100.00%		190	11/21/00	12:05	190	1		DWOdz05	11/22/00
TC1-G10	100.00%		110	11/21/00	12:15	110	1		DWOdz02	11/21/00
TC1-G11	100.00%		150	11/21/00	12:24	150	1		DWOdz02	11/21/00
TC1-G12	100.00%		100	11/21/00	12:33	100	1		DWOdz02	11/21/00
TC1-RD1	25.00%		560	11/21/00	12:00			--	DWOdz02	11/21/00
TC1-RD1	25.00%		490	11/21/00	12:00			--	DWOdz02	11/21/00
TC1-RD1	25.00%		540	11/21/00	12:00	532	3	6.63	DWOdz04	11/22/00
TC1-RD2	25.00%		480	11/21/00	12:03	480	1	--	DWOdz02	11/21/00
TC2-G6	100.00%		130	11/21/00	12:55			--	DWOdz03	11/22/00
TC2-G6	100.00%		140	11/21/00	12:55	136	2	6.25	DWOdz04	11/22/00
TC2-G7	1.56%		2100	11/21/00	12:53			--	DWOdz03	11/22/00
TC2-G7	6.25%		2000	11/21/00	12:53			--	DWOdz03	11/22/00
TC2-G7	6.25%		2000	11/21/00	12:53	2010	3	2.17	DWOdz04	11/22/00
TC2-G8	100.00%		140	11/21/00	12:52	140	1		DWOdz04	11/22/00
TC2-G9	100.00%		110	11/21/00	12:56	110	1		DWOdz04	11/22/00

Table B-2a

TC1 - TC5 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC2-RD1	25.00%		160	11/21/00	12:50			--	DW0dz03	11/22/00
TC2-RD1	25.00%		180	11/21/00	12:50			--	DW0dz03	11/22/00
TC2-RD1	100.00%		250	11/21/00	12:50	198	3	23.95	DW0dz04	11/22/00
TC2-RD2	100.00%		170	11/21/00	12:47			--	DW0dz04	11/22/00
TC2-RD2	100.00%		180	11/21/00	12:47	175	2	4.98	DW0dz04	11/22/00
TC3-G11	100.00%		100	11/21/00	13:08	100	1		DW0dz06	11/22/00
TC3-RD1	100.00%		230	11/21/00	12:58			--	DW0dz04	11/22/00
TC3-RD1	100.00%		240	11/21/00	12:58	238	2	2.80	DW0dz04	11/22/00
TC3-RD2	100.00%		200	11/21/00	12:57			--	DW0dz04	11/22/00
TC3-RD2	100.00%		230	11/21/00	12:57	210	2	10.25	DW0dz04	11/22/00
TC4-G3	100.00%		200	11/21/00	16:05	200	1		DW0dz05	11/22/00
TC4-G6	100.00%		250	11/21/00	15:58	250	1		DW0dz05	11/22/00
TC4-G7	6.25%		4600	11/21/00	16:02	4600	1	--	DW0dz06	11/22/00
TC4-G9	100.00%		230	11/21/00	16:08	230	1		DW0dz05	11/22/00
TC5-G1	100.00%		240	11/21/00	9:53			--	DW0dz05	11/22/00
TC5-G1	100.00%		240	11/21/00	10:00	240	2	0.79	DW0dz06	11/22/00
TC5-G3	25.00%		600	11/21/00	9:53	600	1	--	DW0dz06	11/22/00
TC5-G6	25.00%	OoR-H	1800	11/21/00	9:48	1800	1	--	DW0dz06	11/22/00
TC5-G7	1.56%		15000	11/21/00	9:49	15000	1	--	DW0dz06	11/22/00
TC5-RD1	100.00%		200	11/21/00	10:00	200	1		DW0dz04	11/22/00
SPIKES:										
TC5-G1+sp100	100.00%		270	11/21/00		267	1		DW0dz05	11/22/00
TC5-G1+sp200	100.00%	OoR-H	460	11/21/00		460	1		DW0dz05	11/22/00
TC5-G1+sp25	100.00%		240	11/21/00		240	1		DW0dz05	11/22/00

Table B-2b

TC6 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC6-G1	6.25%		3000	11/29/00	9:50	3000	1		DW0dz09	11/30/00
TC6-G2	6.25%		5300	11/29/00	9:52			--	DW0dz09	11/30/00
TC6-G2	6.25%		4500	11/29/00	9:52	4920	2	11.01	DW0dz10	12/1/00
TC6-G3	100.00%		80	11/29/00	9:55	80	1		DW0dz10	12/1/00
TC6-G5	100.00%		100	11/29/00	9:58	100	1		DW0dz10	12/1/00
TC6-G6	100.00%		250	11/29/00	10:00			--	DW0dz09	11/30/00
TC6-G6	100.00%		270	11/29/00	10:00	258	2	6.04	DW0dz09	11/30/00
TC6-G7	100.00%		390	11/29/00	10:01	390	1		DW0dz09	11/30/00
TC6-G8	25.00%		720	11/29/00	10:10	720	1		DW0dz10	12/1/00
TC6-G10	100.00%		200	11/29/00	10:19	200	1		DW0dz09	11/30/00
TC6-G12	25.00%		370	11/29/00	10:19	370	1		DW0dz09	11/30/00
TC6-G14	25.00%		630	11/29/00	10:50	630	1	--	DW0dz09	11/30/00
TC6-PL1	0.25%		68000	11/29/00	9:30			--	DW0dz10	12/1/00
TC6-PL1	0.25%		74000	11/29/00	9:30			--	DW0dz10	12/1/00
TC6-PL1	0.39%		100000	11/29/00	9:30	82400	3	23.92	DW0dz09	11/30/00
TC6-PL2	6.25%		2100	11/29/00	9:31			--	DW0dz07	11/30/00
TC6-PL2	6.25%		2100	11/29/00	9:31			--	DW0dz08	11/30/00
TC6-PL2	6.25%		2600	11/29/00	9:31	2250	3	13.28	DW0dz10	12/1/00
TC6-PL3	0.02%		1900000	11/29/00	9:34	1900000	1	--	DW0dz10	12/1/00
TC6-PL4	100.00%		200	11/29/00	9:45	200	1		DW0dz09	11/30/00
TC6-PL5	25.00%		360	11/29/00	10:45	360	1	--	DW0dz10	12/1/00
TC6-RD1	100.00%		310	11/29/00	9:35			--	DW0dz07	11/30/00
TC6-RD1	100.00%		310	11/29/00	9:35			--	DW0dz08	11/30/00
TC6-RD1	100.00%		340	11/29/00	9:35				DW0dz10	12/1/00
TC6-RD1	100.00%		370	11/29/00	9:35	336	4	8.59	DW0dz10	12/1/00
TC6-RD2	100.00%		130	11/29/00	9:40			--	DW0dz07	11/30/00
TC6-RD2	100.00%		130	11/29/00	9:40			--	DW0dz08	11/30/00
TC6-RD2	100.00%		150	11/29/00	9:40	137	3	7.13	DW0dz10	12/1/00
BLANKS:										
TC6-blank	100.00%		30	11/28/00	17:00			--	DW0dz09	11/30/00
TC6-blank	100.00%		40	11/28/00	17:00	38	2	16.34	DW0dz09	11/30/00

Table B-2b

TC6 results

[illegible]

Table B-2c

TC7 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC7-G1	100.00%		130	12/10/00	8:58	130	1		DWOdz12	12/13/00
TC7-G1B (field rep)	100.00%		110	12/12/00	9:00	110	1		DWOdz13	12/15/00
TC7-G2	6.25%		770	12/12/00	9:02			--	DWOdz13	12/15/00
TC7-G2	6.25%		650	12/12/00	9:02			--	DWOdz13	12/15/00
TC7-G2	25.00%		990	12/12/00	9:02			--	DWOdz13	12/15/00
TC7-G2	25.00%		1000	12/12/00	9:02			--	DWOdz13	12/15/00
TC7-G2	25.00%		930	12/12/00	9:02	871	5	18.31	DWOdz14	12/15/00
TC7-G2B (field rep)	6.25%		930	12/12/00	9:03			--	DWOdz11	12/13/00
TC7-G2B (field rep)	6.25%		760	12/12/00	9:03			--	DWOdz13	12/15/00
TC7-G2B (field rep)	25.00%		1200	12/12/00	9:03			--	DWOdz11	12/13/00
TC7-G2B (field rep)	25.00%		850	12/10/00	9:03	940	4	20.73	DWOdz14	12/15/00
TC7-G3	6.25%		980	12/12/00	9:07			--	DWOdz11	12/13/00
TC7-G3	25.00%		1200	12/12/00	9:07	1080	2	14.59	DWOdz11	12/13/00
TC7-G4	100.00%		190	12/12/00	9:09	190	1		DWOdz11	12/13/00
TC7-G4B (field rep)	100.00%		210	12/12/00	9:10			--	DWOdz13	12/15/00
TC7-G4B (field rep)	100.00%		220	12/12/00	9:10	218	2	3.69	DWOdz13	12/15/00
TC7-G5	25.00%		190	12/12/00	9:12			--	DWOdz11	12/13/00
TC7-G5	25.00%		240	12/12/00	9:12			--	DWOdz11	12/13/00
TC7-G5	100.00%		260	12/12/00	9:12	228	3	13.97	DWOdz11	12/13/00
TC7-G6	100.00%		150	12/12/00	9:15			--	DWOdz11	12/13/00
TC7-G6	100.00%		150	12/12/00	9:15	151	2	2.98	DWOdz13	12/15/00
TC7-G7	100.00%		110	12/12/00	9:15	110	1		DWOdz11	12/13/00
TC7-G8	100.00%		100	12/12/00	9:20	100	1		DWOdz11	12/13/00
TC7-G9	100.00%		150	12/12/00	9:24	150	1		DWOdz13	12/15/00
TC7-PL1	100.00%		190	12/11/00	18:55	190	1		DWOdz13	12/15/00
TC7-PL2	25.00%		430	12/11/00	18:57	430	1	--	DWOdz13	12/15/00
TC7-PL3	0.06%		140000	12/11/00	18:58			--	DWOdz11	12/13/00
TC7-PL3	0.13%		93000	12/11/00	18:58			--	DWOdz13	12/15/00
TC7-PL3	0.13%		99000	12/11/00	18:58			--	DWOdz14	12/15/00
TC7-PL3	0.13%		93000	12/11/00	18:58			--	DWOdz14	12/15/00
TC7-PL3	0.25%		140000	12/11/00	18:58	112000	5	41.52	DWOdz14	12/15/00
TC7-PL4	25.00%		1200	12/11/00	19:00	1200	1	--	DWOdz11	12/13/00
TC7-RD1	100.00%		260	12/11/00	19:02			--	DWOdz12	12/13/00
TC7-RD1	100.00%		280	12/11/00	19:02	272	2	5.66	DWOdz13	12/15/00
TC7-RD2	100.00%		130	12/11/00	19:03	130	1		DWOdz12	12/13/00
TC7-RD3	100.00%		310	12/11/00	19:05			--	DWOdz12	12/13/00
TC7-RD3	100.00%		300	12/11/00	19:05	304	2	2.21	DWOdz12	12/13/00

Table B-2c

TC7 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
BLANKS:										
TC7-BLANK A	100.00%	OoR-L	20	12/9/00	18:00	<30	1		DWOdz12	12/13/00
TC7-BLANK B	100.00%	OoR-L	20	12/11/00	16:23	<30	1		DWOdz12	12/13/00
Pan rinse after TC6										
TC7-WD2	10.00%		1000	12/10/00	9:42			--	DWOdz12	12/13/00
TC7-WD2	25.00%		1300	12/10/00	9:42			--	DWOdz12	12/13/00
TC7-WD2	25.00%		1100	12/12/00	9:42	1120	3	13.9	DWOdz14	12/15/00
TC7-WD3	10.00%		930	12/10/00	9:57			--	DWOdz12	12/13/00
TC7-WD3	25.00%		990	12/12/00	9:55	960	2	3.22	DWOdz14	12/15/00
TC7-WD4	100.00%		170	12/12/00	9:47	170	1	N/A	DWOdz14	12/15/00
TC7-WM2	10.00%		1100	12/12/00	9:43	1100	1		DWOdz14	12/15/00
TC7-WM4	10.00%	OoR-L	320	12/12/00	9:49	320	1		DWOdz14	12/15/00

Table B-2d

TC8 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC8-G1A	100.00%		150	12/12/00	8:58			--	DW0dz13	12/15/00
TC8-G1A	100.00%		130	12/15/00	10:06	140	2	14.55	DW0dz14	12/15/00
TC8-G1B	100.00%		130	12/15/00	10:09	130	1		DW0dz14	12/15/00
TC8-G1C	100.00%		130	12/15/00	10:07	130	1		DW0dz14	12/15/00
TC8-G2A	25.00%		1000	12/12/00	10:12			--	DW0dz13	12/15/00
TC8-G2A	25.00%		890	12/15/00	10:12			--	DW0dz13	12/15/00
TC8-G2A	25.00%		1200	12/15/00	10:12			--	DW0dz13	12/15/00
TC8-G2A	25.00%		980	12/15/00	10:12	1020	4	13.01	DW0dz14	12/15/00
TC8-G2B	25.00%		1000	12/15/00	10:13	1000	1		DW0dz14	12/15/00
TC8-G2C	25.00%		1000	12/15/00	10:15	1000	1		DW0dz14	12/15/00
TC8-G3	25.00%		920	12/12/00	10:18	920	1		DW0dz13	12/15/00
TC8-G4A	100.00%		240	12/15/00	10:20	240	1		DW0dz14	12/15/00

Table B-2e

TC10 - TC12 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC10-PL1	100.00%		170	1/8/01	10:27	170	1		DWOdz15	1/11/01
TC10-PL2	6.25%		2200	1/8/01	10:30	2200	1	N/A	DWOdz17	1/11/01
TC10-PL3	1.25%		6400	1/8/01	10:32			--	DWOdz15	1/11/01
TC10-PL3	5.00%		5300	1/8/01	10:32	5830	2	13.16	DWOdz16	1/11/01
TC10-PL4	6.25%		2100	1/8/01	10:34	2100	1	N/A	DWOdz17	1/11/01
TC11-G1	100.00%		70	1/10/01	9:40	<100	1		DWOdz15	1/11/01
TC11-G2	25.00%		350	1/10/01	9:42	350	1	--	DWOdz15	1/11/01
TC11-G3	25.00%		300	1/10/01	9:45	300	1	--	DWOdz15	1/11/01
TC11-G4	100.00%		140	1/10/01	9:46			--	DWOdz15	1/11/01
TC11-G4	100.00%		120	1/10/01	9:46			--	DWOdz15	1/11/01
TC11-G4	100.00%		120	1/10/01	9:46	127	3	10.17	DWOdz15	1/11/01
TC11-G5	100.00%		70	1/10/01	9:48	<100	1		DWOdz15	1/11/01
TC11-G6	100.00%		100	1/10/01	9:50	100	1		DWOdz15	1/11/01
TC11-PL1	100.00%		150	1/10/01	9:54	150	1		DWOdz17	1/11/01
TC11-PL2	5.00%		2200	1/10/01	9:56	2200	1		DWOdz17	1/11/01
TC11-PL3	1.25%		14000	1/10/01	9:59	14000	1	--	DWOdz17	1/11/01
TC11-PL4	5.00%		7300	1/10/01	10:02	7300	1		DWOdz17	1/11/01
TC11-RD1	100.00%		190	1/10/01	10:03	190	1		DWOdz15	1/11/01
TC11-RD2	100.00%		130	1/10/01	10:03	130	1		DWOdz15	1/11/01
TC12-G1	100.00%		40	1/11/01	10:47	<100	1		DWOdz17	1/11/01
TC12-G2	100.00%		250	1/11/01	10:45	250	1		DWOdz16	1/11/01
TC12-G3	100.00%		380	1/11/01	10:43			--	DWOdz15	1/11/01
TC12-G3	100.00%		360	1/11/01	10:43	370	2	5.39	DWOdz16	1/11/01
TC12-G4	100.00%		70	1/11/01	10:39	<100	1		DWOdz17	1/11/01
TC12-G5	100.00%		60	1/11/01	10:46	<100	1		DWOdz17	1/11/01
TC12-G6	100.00%		50	1/11/01	10:42	<100	1		DWOdz17	1/11/01
TC12-PL1	100.00%		230	1/11/01	10:34	230	1		DWOdz16	1/11/01
TC12-PL2	5.00%		3200	1/11/01	10:35	3200	1	N/A	DWOdz17	1/11/01
TC12-PL3	1.25%		22000	1/11/01	10:37	22000	1	N/A	DWOdz17	1/11/01
TC12-PL4	6.25%		1100	1/11/01	10:38	1100	1	N/A	DWOdz17	1/11/01
BLANK:										
TC11-BLANK	100.00%		80	1/9/01	13:08	80	1		DWOdz16	1/11/01
EXTENDED HOLDING PERIOD										
TC12-PL2+h48d	6.25%		2800	1/11/01	10:35	2800	1		DWOdz22	2/28/01

Table B-2f

TC13 - TC16 results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
TC13-PLA	100.00%		70	2/24/01	14:30	<100	1		DWOdz21	2/28/01
TC13-PLB	100.00%		80	2/24/01	14:35	<100	1	N/A	DWOdz22	2/28/01
TC13-PLC	10.00%		1800	2/24/01	14:40	1800	1	N/A	DWOdz21	2/28/01
TC13-PLD	2.50%		1800	2/24/01	14:45			--	DWOdz21	2/28/01
TC13-PLD	10.00%		2100	2/24/01	14:45			--	DWOdz21	2/28/01
TC13-PLD	6.25%		2000	2/24/01	14:45	1960	3	5.36	DWOdz22	2/28/01
TC13-RDE	100.00%		70	2/24/01	14:50	<100	1		DWOdz21	2/28/01
TC14-G1	25.00%		120	3/2/01	11:40			--	DWOdz23	3/6/01
TC14-G1	100.00%		150	3/2/01	11:40	138	2	15.62	DWOdz23	3/6/01
TC15-PL1	100.00%		370	3/4/01	17:30	370	1		DWOdz23	3/6/01
TC15-PL2	6.25%		1100	3/4/01	17:30			--	DWOdz23	3/6/01
TC15-PL2	6.25%		990	3/4/01	17:30	1030	2	5.74	DWOdz23	3/6/01
TC15-PL3	100.00%		50	3/4/01	17:30	<100	1	--	DWOdz23	3/6/01
TC15-G1	100.00%		220	3/5/01	17:40	220	1		DWOdz23	3/6/01
TC16-G1	100.00%		140	3/5/01	11:05	140	1		DWOdz23	3/6/01
BLANKS:										
TC14-BLANK	100.00%		60	3/1/01	19:30	63	1		DWOdz23	3/6/01
SPIKES:										
TC13-PLD+spike 800	10.00%		2800	2/28/01	21:30			--	DWOdz22	2/28/01
TC13-PLD+spike 800	6.25%		2200	2/28/01	21:30	2490	2	18.36	DWOdz22	2/28/01

Table B-2g

OK results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
OK-1	25.00%		500	11/21/00	19:00			--	DWOdz03	11/22/00
OK-1	25.00%		450	11/21/00	19:00	478	2	7.08	DWOdz06	11/22/00
OK-2	25.00%		370	11/21/00	19:00	370	1	N/A	DWOdz03	11/22/00
OK-3	6.25%		840	11/21/00	19:00			--	DWOdz03	11/22/00
OK-3	25.00%		840	11/21/00	19:00			--	DWOdz03	11/22/00
OK-3	25.00%		880	11/21/00	19:00			--	DWOdz06	11/22/00
OK-3	25.00%		730	11/21/00	19:00	824	4	7.78	DWOdz06	11/22/00
OK-4	100.00%		150	11/29/00	0:00			--	DWOdz07	11/30/00
OK-4	100.00%		170	11/29/00	8:00			--	DWOdz07	11/30/00
OK-4	100.00%		150	11/29/00	0:00			--	DWOdz08	11/30/00
OK-4	100.00%		170	11/29/00	8:00	158	4	8.30	DWOdz08	11/30/00
OK-5	25.00%		150	11/29/00	0:00			--	DWOdz07	11/30/00
OK-5	25.00%		150	11/29/00	0:00			--	DWOdz08	11/30/00
OK-5	100.00%		150	11/29/00	8:00			--	DWOdz07	11/30/00
OK-5	100.00%		150	11/29/00	8:00	151	4	0.28	DWOdz08	11/30/00
OK-6	100.00%		100	11/29/00	8:00			--	DWOdz07	11/30/00
OK-6	100.00%		100	11/29/00	8:00			--	DWOdz08	11/30/00
OK-6	100.00%		90	11/29/00	8:00	96	3	2.52	DWOdz09	11/30/00
BLANK:										
OK-"4" CONTROL	100.00%		30	11/21/00	0:00	30	1		DWOdz03	11/22/00

Table B-2h

DR results

Sample ID	Dilution in well, %	Range Flag	ELISA Diazinon (ppt)	Sample date	Sample time	Average value	No. of Run Replicates	%CV of Replicates	ELISA Run ID	ELISA date
DR1SS-1	6.25%		1500	2/10/01	12:30	1500	1	N/A	DWOdz19	2/13/01
DR1SS-2	0.05%		310000	2/10/01	12:30	310000	1	N/A	DWOdz19	2/13/01
DR1SS-3	0.06%		220000	2/10/01	12:30			--	DWOdz19	2/13/01
DR1SS-3	0.25%		150000	2/10/01	12:30	181000	2	94.58	DWOdz19	2/13/01
DR1SS-4	0.50%		22000	2/10/01	13:00	22000	1	N/A	DWOdz19	2/13/01
DR1SS-5	0.01%		700000	2/10/01	13:00			--	DWOdz19	2/13/01
DR1SS-5	0.01%		800000	2/10/01	13:00	746000	2	9.16	DWOdz19	2/13/01
DR1SS-6	100.00%		370	2/11/01	15:30	370	1		DWOdz18	2/13/01
DR1SS-7	6.25%		1300	2/11/01	15:30	1300	1	N/A	DWOdz19	2/13/01
DR1SS-8	2.50%		2700	2/11/01	15:30	2700	1	N/A	DWOdz19	2/13/01
DR1SS-9	0.25%		51000	2/11/01	16:00			--	DWOdz19	2/13/01
DR1SS-9	0.25%		53000	2/11/01	16:00	52100	2	3.53	DWOdz19	2/13/01
DR2SS-A	6.25%		2800	2/18/01	15:00	2800	1	--	DWOdz20	2/21/01
DR2SS-B	6.25%		760	2/18/01	15:00			--	DWOdz20	2/21/01
DR2SS-B	25.00%		860	2/18/01	15:00	812	2	8.84	DWOdz20	2/21/01
DR2SS-C	25.00%		300	2/18/01	15:00	300	1	--	DWOdz20	2/21/01
DR2SS-D	25.00%		1200	2/18/01	15:00	1200	1	--	DWOdz20	2/21/01
DR2SS-E	0.25%		73000	2/18/01	15:00			--	DWOdz20	2/21/01
DR2SS-E	0.25%		84000	2/18/01	15:00			--	DWOdz20	2/21/01
DR2SS-E	0.06%		61000	2/18/01	15:00	72800	3	15.81	DWOdz20	2/21/01
DR3SS-E	1.25%		2800	2/24/01	16:00	2800	1	N/A	DWOdz21	2/28/01
DR3SS-F	1.56%		5000	2/24/01	16:02			--	DWOdz22	2/28/01
DR3SS-F	6.25%		5400	2/24/01	16:02	5200	2	171.30	DWOdz22	2/28/01
DR3SS-G	25.00%		230	2/24/01	16:05			--	DWOdz22	2/28/01
DR3SS-G	100.00%		290	2/24/01	16:05	260	2	152.14	DWOdz22	2/28/01
DR3SS-H	6.25%		1100	2/24/01	16:07	1100	1	--	DWOdz22	2/28/01
DR4SS-A	25.00%		1100	3/4/01	16:30	1100	1	--	DWOdz23	3/6/01
DR4SS-B	100.00%		90	3/4/01	16:35	<100	1		DWOdz23	3/6/01
DR4SS-C	100.00%		100	3/4/01	16:40	100	1		DWOdz23	3/6/01
DR4SS-D	100.00%		390	3/4/01	16:45	390	1		DWOdz23	3/6/01
DR4SS-E	1.56%		11000	3/4/01	16:50	11000	1	--	DWOdz23	3/6/01

APPENDIX C.-- ELISA data QA/QC

APPENDIX C.-- ELISA data QA/QC

Methods

Appendix B contains a summary of ELISA results for samples collected from test plots and also test ELISA analyses were conducted within 11 days of sample collection. ELISA procedures and data entry into a spreadsheet calculation template followed Katznelson and Feng (1998) except that a 5-point calibrator curve was used

Results and Discussion

Review of ELISA run data. ELISA analysis was conducted in "runs" using up to three strips of 12 wells each. Each run included two replicates of prepared calibration standards and of a laboratory control standard "E". Most of the three strip runs used a 5-point calibration curve while 2-strip runs generally used 4-point calibration. Table C-1, ELISA Run Statistics, summarizes characteristics for the 34 runs in which project samples were analyzed.

Coefficients of variation expressed as a percentage (%CV) for calibrator sets were below the manufacturer's recommended maximum of 15%CV in all except two runs. For one of these runs, the nonconforming calibrator set had %CV of 15.9%, which was judged acceptable since the manufacturer's recommendation assumes calibrator replicates are in adjacent wells, while the practice for this project is to space them at opposite ends of the run so that within-run drift is an additional source of variation. The other run, DWOdz26A, was also the only run for which the square of the correlation coefficient (r^2) for the calibrator curve did not meet the minimum guideline of 0.95 suggested in the Urban Pesticide Committee's draft QA/QC program (Tomko, 1998, cited as Exhibit E in DPR's grant contract documents). Most samples from this run were retested and the others were flagged with a "*" qualifier in the summary table.

ELISA laboratory control: Variation in "E" values for most runs was within the guidelines proposed to the UPC by the Aquatic Toxicology lab at UC Davis. For the two runs with abnormally low "E" values (DWOdz25 and DWOdz30), runoff samples were retested and the remaining ones flagged with an "E-" qualifier. Most of these qualified samples were of controls or equipment rinses.

Field blanks: For the test plots, the control samples served as equipment blanks. Plastic rinse trays were initially washed with Alconox and rinsed with tap water followed by 1% hydrochloric acid and methanol after each runoff spray interval. This procedure did not remove all diazinon from the pans, as shown by the results for SPcon samples that initially reused the pans from the normal application treatment. New pans were obtained for the 0.5x and 2x normal rate treatments; retests of the control pavers (Spcon-post) were below the detection limit.

Field blank samples were taken for test site samples by adding 10-20 ml of tap water to a glass pan, rinsing the inner surface and pouring the water into a 20 ml vial. Of six blank samples, three showed non-detects for diazinon at the manufacturer's specified lower

limit of 30 nanograms/liter (ng/l or parts per trillion). The other three were between 50 and 100 ng/l, well below the majority of the sample concentrations.

Field replication: Replicate glass pans were placed at some Turner Court stations and the samples were collected and analyzed in parallel. The %CV remained of below 15% in 5 of 6 sets of field replicates; for the exception, TC7-G2, this can be attributed to variation among ELISA replicates in the laboratory.

ELISA replicates: 79 samples were analyzed in one or more replicates taken from the field sample vial in the lab; %CV of 58 of these sets were within the 15%CV criterion. Potential sources of error for the remaining 21 replicate sets were probably related to the dilution required to produce test solutions within the calibration range of the ELISA method (30-400 ng/l). All of the replicate sets with %CV greater than 15 had at least one of the following factors present: a) the inclusion of samples tested at different dilution factors; b) samples requiring high dilution factors; c) extremely low concentrations below the minimum detection level. Because of the high concentrations of these samples, the additional error is acceptable for the purposes of this study.

Matrix spikes: The spray solution applied to test plots was tested after parallel serial dilutions using HPCL water and the field control sample as matrix. Relative percent difference between the ELISA analyses of the two solutions was 4%. A set of calibration standards that was mixed with the matrix was also comparable to the standards in HPLC. The concentrate provided in the ELISA kits for mixing calibrators was not strong enough to positively spike the typical plot samples, i.e. would result in net dilution.

Four Turner Court glass pan samples were collected into 250 ml glass jars and aliquots were spiked using the concentrate provided in the ELISA kits for mixing calibrators. Spike concentrations varied with the sample, ranging over all from 0.10 to 11 times the calculated sample concentrations (Table C-2). Percent recovery was good for spikes greater than the sample concentration (Sample TC6-PL5) and diminished sharply when spike concentrations were small relative to the sample, and also for the very "hot" sample TC6-PL1.

Analytical Laboratory results: Five composite samples were sent to Toxscan (Watsonville, CA) for gas chromatography analysis (EPA method 8141A). Relative percent difference between averaged ELISA estimates for the individual samples and the lab composite analysis varied from -3.3% to +197% (Table C-3). The laboratory's spike of one of the samples was not high enough to produce a signal (see Appendix D).

ELISA run statistics

Table C-2 Recovery of matrix spikes

Sample ID	Sample diazinon, ppb	Calculated spike	Spike diazinon, ppb	% recovery
TC5-G1	0.24	.0.10	0.027	27
"	"	0.20	0.22	112
"	"	0.025	0.002	10
TC6-PL1	82	20	-22	-110
TC6-PL5	0.36	1.0	0.94	94
"	"	1.9	1.85	97
"	"	4.0	4.3	110
TC13-PLD	1.96	0.80	0.54	67

Table C-3 Comparison of laboratory vs. ELISA results

Sample ID	ELISA average diazinon, ppm	EPA 8141A composite diazinon, ppm	Relative percent difference (RPD)
R10-1	1.5	1.6	-5.4
R10-2	1.8	0.62	+197
R10-4	0.47	0.50	-5.9
R10-5	0.31	0.32	-3.3
R10-6	0.15	0.26	-42.1

APPENDIX D.-- Data summary tables from Turner Court test site

Table D-1a. Diazinon concentrations (ppb) in Turner Court samples, Nov.-Dec. 2000

[illegible]

Table D-1b. Diazinon concentrations (ppb) in Turner Court samples, Jan-Mar 2001

Sampling Date		8-Jan	9-Jan	11-Jan	24-Feb	2-Mar	4-Mar	4-Mar
Event No		5a	5b	5c	6	7a	7b	7c
Station ID	Description							
BID-NE	Between Yard gate and handicap park sign		<0.10	<0.10				
SHOP-SW	SW Corner of Supply Shop		0.35	0.25				
SHOP-NW	NW Corner of Supply Shop		0.30	0.37		0.14	0.22	0.14
M&O-S	Sidewalk south of M&O Bldg, east of tree well		0.10	<0.10				
PK-A86N	Vehicle Parking lot, by sign for A86N		0.13	<0.10				
TRAF-NE	Near Stop Sign, NE of Traffic Bldg		<0.10	<0.10				
SHOP-S	Puddle in pavement south of Supply Shop	5.8	14	22	2.0		1.0	
SHOP-N	Puddle in pavement north of Supply Shop	2.1	7.3	1.1				
SHOP-NW	Puddle in pavement NW of supply shop				1.8			
TANK-W	Puddle west of concrete slab over gas tanks				<0.10			
TANK-NW	Puddle North of concrete slab over gas tanks	2.2	2.2.2	3.2			0.37	
GAS-W	Puddle in pavement west of gas pumps	0.17	0.15	0.23	<0.10		<0.10	
SHOP-RDNE	Roof downspout at NE corner of Supply Shop				<0.10			

Table D-2. Estimated diazinon in rainfall at Turner Court (micrograms/ sq. ft.) for rain events in November and December 2000

= (concentration * sample volume/1000) * (144 / 64 pan area factor)

Sampling Date		21-Nov	21-Nov	21-Nov	21-Nov	22-Nov	29-Nov	11-Dec	12-Dec	15-Dec
Event No		1a	1b	1c	1d	1e	2	3a	3b	4
Station ID	Description									
BID-NE	Between Yard gate and handicap park sign	0.039	0.006	--	0.017	0.041	0.018	--	0.064	0.173
BID-NE-B,C	replicates	0.073	--	--	--	--	--	--	0.054	0.170
SHOP-SW	SW Corner of Supply Shop	--	--	--	--	--	1.103	--	0.431	1.350
SHOP-SW-B	replicates	--	--	--	--	--	--	--	0.465	1.260
SHOP-NW	NW Corner of Supply Shop	0.743	0.135	--	0.259	0.169	0.675	--	0.520	1.180
M&O-S	Sidewalk south of M&O Bldg, east of tree well	0.059	--	--	--	--	0.059	--	0.086	0.275
M&O-S-B	replicate	--	--	--	--	--	--	--	0.104	--
PK-A86N	Vehicle Parking lot, by sign for A86N	--	--	--	--	--	0.162	--	0.109	--
PK-A89AN	Vehicle Parking lot, north of sign for A89A	0.032	--	--	--	--	--	--	--	--
PK-J51FN	Vehicle Parking lot, north of sign for J51F	0.015	--	--	--	0.138	0.077	--	--	--
TS2-SE	SE Corner of Truck Shed 2,	0.049	--	--	0.016	0.047	0.045	--	0.069	--
YARD-NE	NE Corner of Yard	0.046	--	--	--	--	0.025	--	--	--
YARD-E	East Side of Yard	--	--	--	--	--	--	--	0.054	--
WASH-NW	NW Corner of Truck Wash low wall	0.061	--	--	--	--	0.083	--	0.064	--
YARD-S	South Side of Yard	0.000	--	--	--	--	0.032	--	--	--
TRAF-NE	Near Stop Sign, NE of Traffic Bldg	0.039	0.007	--	0.013	--	0.142	--	0.053	--
TRAF-NE-B	replicates	0.056	--	--	--	--	--	--	--	--
M&O-SW	Beyond Gas Meter at SW Corner of M&O Bldg	0.032	--	0.007	--	--	0.015	--	--	--
M&O-LUN	S of Land Dev Lunch Enclosure at M&O Bldg	--	--	--	--	--	0.022	--	--	--
M&O-SE	Trash Can at SE Corner of M&O Bldg	--	--	--	--	--	0.088	--	--	--
VISITOR	On Storm Drain in Visitor Parking Area, handicap spaces	0.017	--	--	--	--	--	--	--	--

APPENDIX E.-- Toxscan laboratory report



42 Hangar Way • Watsonville, CA 95076-2404 • (831) 724-4522 • FAX (831) 724-3188

August 8, 2001

ToxScan Number: T-19602

Alameda County
951 Turner Ct., Room 300
Hayward, CA 94545

Attn: Arleen Feng

Project Name: ACCEP/DPR
Project Number: F15W81K45
Date Sampled: July 25, 2001
Date Received: July 27, 2001
Matrix: Water

Please find the enclosed test results for the parameters requested for analyses. The samples were analyzed within holding time using the following method:

Diazinon by EPA Method 8141A

The samples were received intact and were handled with the proper chain-of-custody procedures. Appropriate QA/QC guidelines were employed during the analyses on a minimum of a 5% basis. QC results were generally within limits and are reported with or following the data for each analysis.

If you have any questions or require any additional information, please feel free to call.

Sincerely,

A handwritten signature in black ink that reads "Philip D. Carpenter". The signature is written in a cursive, flowing style.

Philip D. Carpenter, Ph.D.
President

Enclosures.

This cover letter is an integral part of the report.

Client: Alameda County
Method: EPA 8141A
Extraction Date: 7/27/01
Analysis Date: 8/1/01
Matrix: Water
Units: mg/L (ppm)

ToxScan Number: T-19602

<u>Client</u> <u>Sample ID</u>	<u>ToxScan</u> <u>Lab ID</u>	<u>Analyte</u>	<u>Sample</u> <u>Value</u>	<u>Reporting</u> <u>Limit</u>
AC-DW1,1A	T-19602-01	Diazinon	1.6	0.20
AC-DW2A	T-19602-02	Diazinon	0.62	0.20
AC-DW4,4A	T-19602-04	Diazinon	0.50	0.20
AC-DW5	T-19602-05	Diazinon	0.32	0.02
AC-DW6	T-19602-06	Diazinon	0.26	0.02
Method Blank		Diazinon	ND	0.002

Client: Alameda County
Method: EPA 8141A
Extraction Date: 7/27/01
Analysis Date: 8/1/01
Matrix: Water

ToxScan Number: T-19602

Matrix Spike on Sample AC-DW5A

<u>Compound</u>	<u>LCS % Rec</u>	<u>Matrix Spike</u>	
		<u>% Recovery</u>	<u>QC Limits</u>
Diazinon	96	D*	50-150
Disulfoton	87	123	50-150
Ethion	109	90	50-150
Azinphos methyl	114	24	50-150

* Diluted out by matrix

LCS = Laboratory Control Sample